

REMARKS

Claims 16, 17, 20, 22, 27 and 28 are now pending in the application. Claims 16, 20 and 22 are amended herein simply to clarify the features of the claimed invention. In accordance with the suggestion by the Examiner, the word “thereby” is added to both claims 16 and 20. In claim 16, the phrase “to coat each of the plurality of pixel regions” is added since it had been erroneously deleted. Please note that this phrase is included in the previously amended claim 20. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 20, 22 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masazumi et al. (U.S. Pat. No. 6,331,884) in view of Hashizume et al. (U.S. Pat. Pub. No. 2002/0062787) and further in view of Yamamoto et al. (Japanese Patent No. 09-138410). This rejection is respectfully traversed.

Claim 20 calls for a liquid crystal discharging device that includes the features that:

“the controller makes said discharge unit discharge the liquid droplets from the nozzles such that:

each of the liquid droplets has said weight;

and thereby, the diameter of the liquid droplets after impact is roughly equal to the arrangement pitch of the plurality of pixel regions, to coat each of the plurality of pixel regions with the liquid droplets having a joined portion therebetween; and

the joined portion of the liquid droplets is located at a boundary of the pixel regions”.

According to the claimed liquid crystal discharging device, the liquid droplets are discharged/arranged on the substrate such that the peripheral edges thereof which join with the neighboring liquid droplets are reliably disposed on boundaries between the pixels, which are non-displaying portions. With this feature, the liquid crystal discharging device according to claim 20 can reliably resolve the problem explained in the original specification (i.e., “In the case of methods for forming a film on a substrate by discharging a liquid material in the form of liquid droplets, or methods for arranging liquid crystal on a substrate by discharging the liquid crystal in the form of liquid droplets, the peripheral edges of the liquid droplets tend to remain unevenly in the form of drop marks. *This unevenness causes a deterioration of uniformity of the film thickness, and may cause a deterioration of visibility in displays such as liquid crystal devices*” on page 2, lines 1 to 6, in the original specification of the present application).

The Office Action relies on the resin 9b shown in FIG. 1B of Masazumi et al. to assert that “the diameter of the liquid droplets after impact is *roughly equal* to the arrangement pitch of the plurality of pixel regions” since the resin 9b ***should*** have small size.

The Applicant agrees with this only in the point in that ***the resin 9b’ exists between the liquid droplets 9a, 9a’ and 9” after impact.*** However, the Applicant respectfully submits that ***the liquid droplets 9a, 9a’ and 9” after impact are separated from each other and therefore have no joined portions therebetween.*** Furthermore, since there is no joined portions between the liquid droplets 9a, 9a’ and 9”

after impact, it is impossible to locate the joined portions of the liquid droplets at a boundary of the pixel regions. That is, Masazumi et al. fails to disclose an important feature of the claimed invention.

The Examiner also cited Hashizume et al. in the Office Action. The measurement device 54 disclosed therein, however, cannot cure the above defect of Masazumi et al.

The Examiner further cited Yamamoto et al. in the Office Action and asserted that FIG. 7 indicates that the diameter of the liquid droplets after impact should be considered. However, Applicant respectfully submits that one skilled in the art would not combine Masazumi et al. and Yamamoto et al. because Masazumi et al. discloses separated liquid droplets 9a, 9a' and 9" after impact, which therefore have no need for joined portions therebetween. Therefore, Yamamoto et al. also cannot cure the above defect of Masazumi et al.

Accordingly, the Applicant believes that the currently amended claim 20 cannot be rendered obvious by the combination of Masazumi et al., Hashizume et al., and Yamamoto et al., and therefore should be allowed.

Furthermore, the Applicant believes that claims 22 and 28 also should be allowed due at least to their dependency on allowable independent claim 20.

Claims 16, 17, 20 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hsieh et al. (U.S. Pat. No. 6,867,840) in view of Hashizume et al. (U.S. Pat. Pub. No. 2002/0062787) and further in view of Yamamoto et al. (Japanese Patent No. 09-138410). This rejection is respectfully traversed.

Claims 16 and 17

First, since currently amended claim 16 includes the word “thereby” which was suggested by the Examiner in the Office Action, the Applicant believes that the currently amended claim 16 is distinguishable over Hsieh, as mentioned by the Examiner in the Office Action.

Second, it should be noted that passages 630 shown in FIGS. 7A to 7F were not formed by “discharging the liquid droplets from the nozzles such that: each of the liquid droplets has said weight; thereby, the diameter of the liquid droplets after impact is roughly equal to the arrangement pitch of the plurality of pixel regions, to coat each of the plurality of pixel regions with the liquid droplets having a joined portion therebetween; and the joined portion of the liquid droplets is located at a boundary of the pixel regions”. This is clear from the description of Hsieh et al. that “As shown in FIG. 7A to 7N, in the invention, the adjacent micro cell structures are connected by a passage 630. ***When the liquid crystal is provided within one micro cell structure, the liquid crystal can uniformly fill other micro cell structure by the passages***”. This description clearly indicates that the passage 630 is formed by injecting only one shot, and not by injecting two shots. Therefore, FIGS. 7A to 7F of Hsieh et al. are still insufficient to teach the subject matter of currently amended claim 16.

The Examiner cited Hashizume et al. in the Office Action. The measurement device 54 disclosed therein, however, cannot cure the above defect of Hsieh et al.

The Examiner further cited Yamamoto et al. in the Office Action, and asserted that FIG. 7 indicates that the diameter of the liquid droplets after impact should be considered. However, the Applicant respectfully submits that one skilled in the art

would not combine Hsieh et al. and Yamamoto et al. because Hsieh et al. controls the arrangement pitch between the liquid droplets **by the recessed portions formed in the substrate** (refer to FIGS. 7A to 7F of Hsieh et al.), while Yamamoto controls the arrangement pitch between the liquid droplets by employing area-type inkjet nozzles having a predetermined pitch shown in FIG. 1 (that is, the substrate does not control the arrangement pitch). Therefore, Yamamoto et al. also cannot cure the above defect of Hsieh et al.

Accordingly, the Applicant believes that currently amended claim 16 cannot be rendered obvious by the combination of Hsieh et al., Hashizume et al., and Yamamoto et al., and therefore should be allowed.

Furthermore, the Applicant believes that claim 17 also should be allowed due at least to its dependency on allowable independent claim 16.

Claims 20 and 22

First, the Examiner stated that incorporating “thereby” into claim 20 was still insufficient for overcoming the outstanding rejection because locating the joined portion of the liquid droplets regards the intended use of the device. The Applicant disagrees with this comment because this feature is **not executed by a user but instead by the controller** which is one of the components of device, as clearly stated in currently amended claim 20 (refer to “**the controller makes** said discharge unit discharge the liquid droplets from the nozzles such that:.. the joined portion of the liquid droplets is located at a boundary of the pixel regions”). Therefore, incorporating “thereby” into claim 20 clearly distinguishes the claimed invention over Hsieh et al.

Furthermore, Hsieh et al. is insufficient to render claim 20 obvious for at least the same reason as mentioned above for claim 16 (i.e., “passages 630 shown in FIGS. 7A to 7F were not formed by discharging the liquid droplets from the nozzles such that: each of the liquid droplets has said weight; thereby, the diameter of the liquid droplets after impact is roughly equal to the arrangement pitch of the plurality of pixel regions, to coat each of the plurality of pixel regions with the liquid droplets having a joined portion therebetween; and the joined portion of the liquid droplets is located at a boundary of the pixel regions”).

In addition, the measurement device 54 disclosed in Hashizume et al. cannot cure the above defect of Hsieh et al.

Furthermore, as stated above, one skilled in the art would not combine Hsieh et al. and Yamamoto et al. because Hsieh et al. controls the arrangement pitch between the liquid droplets **by the recessed portions formed in the substrate** (refer to FIGS. 7A to 7F of Hsieh et al.), while Yamamoto controls the arrangement pitch between the liquid droplets by employing area-type inkjet nozzles having a predetermined pitch shown in FIG. 1 (that is, the substrate does not control the arrangement pitch). Therefore, Yamamoto et al. also cannot cure the above defect of Hsieh et al.

Accordingly, the Applicant believes that currently amended claim 16 cannot be rendered obvious by the combination of Hsieh et al., Hashizume et al., and Yamamoto et al., and therefore should be allowed.

Furthermore, the Applicant believes that the claim 22 also should be allowed due at least to its dependency on allowable independent claim 16.

Claims 27 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hsieh et al. (U.S. Pat. No. 6,867,840) in view of Hashizume et al. (U.S. Pat. Pub. No. 2002/0062787) and further in view of Yamamoto et al. (Japanese Patent No. 09-138410) and further in view of Yamamoto et al. (U.S. Pat. Pub. No. 2004/0201818). This rejection is respectfully traversed.

As mentioned in the above, Hsieh et al., Hashizume et al., and Yamamoto et al. are insufficient to render independent claims 16 and 20 obvious.

The Examiner now further relies on Yamamoto'818. Yamamoto'818 does not disclose or suggest locating the joined portion of the liquid droplets at a boundary of the pixel regions, and therefore cannot cure the defects of Hsieh et al., Hashizume et al., and Yamamoto et al.

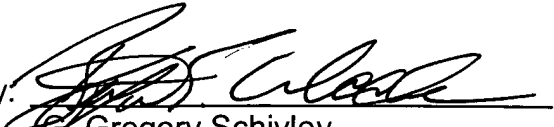
Accordingly, since claims 27 and 28 depend from allowable claim 16 or 20, the Applicant believes that claims 27 and 28 should also be allowed.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: March 24, 2008

By: 
G. Gregory Schivley
Reg. No. 27,382
Bryant E. Wade
Reg. No. 40,344

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

[GGS/BEW/pvd]